In September, I was privileged to attend IMTS 2010. Due to continuing media reports of a weak economy, I expected to be underwhelmed by both the exhibitors’ offerings and the number of attendees.

Boy, was I ever wrong!
McCormick Place was bustling with motivated attendees, and the exhibits were loaded with new technology. The energy in the place was palpable!

During my two days at the show I conducted 17 interviews which are the basis for this article. Based upon exhibitors’ comments, the dour media drumbeat on the demise of our industrial economy is off the mark. There is activity out there and optimism in the air.

These highlights will be presented in two parts: A brief summary of the highlights of general trends for each EDM discipline, followed by the highlights of the various individual exhibitors that I visited. Before I begin, I’d like to express my gratitude to all of the exhibitors I visited for the cordial reception I received and their willingness to provide the technical information I requested. Finally, please note that it would be impossible for me to relate all that I saw at the show in this limited space. As a result, the individual exhibitor’s highlights listed below are just a brief overview of the numerous interesting technologies on display at the show.

### Summary by EDM Sector

#### Wire EDM
- Oil-based dielectric Wire EDMs designed for ultra precision work were shown by three OEMs. The primary advantages of oil-based dielectric are smaller slot widths and the elimination of all dielectric corrosion effects. Power supplies have been redesigned to give speeds competitive to water dielectric machines.
  - Energy conscious machine designs were evident throughout the show. OEMs have incorporated such features as recycling the energy from unused discharges, eliminating resistor based generator circuits, and controls that manage total machine energy usage including shutting off dielectric pumps during machine idle periods.
  - Improved surface integrity was promoted by a number of OEMs. The phrase “virtually eliminates micro-cracking” was heard in a number of booths.

#### Sinker EDM
- More and more CNC Sinkers are being introduced that are “automation ready”, indicating that the industry is moving forward to integrating Sinker machines more closely with robotic systems.
A number of high end Sinkers were shown with micro hole burning optional systems.

Virtually all OEMs displayed impressive examples of “no flush” thin rib cavity burns that demonstrated the remarkable abilities of the “high speed jump” technologies to burn narrow, deep cavities at high speed with little electrode wear.

**Small Hole EDM**

Airfoil cooling hole applications continue to dominate this sector. Most builders showed 5+ axis systems along with the ability to burn the diffuser along with the cooling hole in the same setup.

**Exhibitor Highlights**

(Presented in alphabetical order)

**Accutex EDM**

The big news at Accutex, now a division of Absolute Machine Tools, is that they now have a comprehensive line of EDM equipment encompassing Wire, Sinker, and Small Hole machines.

Accutex introduced their SP line of Wire EDMs featuring an integrated power supply that allows a substantially reduced footprint, highly valued for production cell applications. A new power supply boasts a 25% increase in cutting speed. The Accutex SD Master (Stabilized Discharge) power circuit is said to obtain .0001” straightness in a 60mm single pass cut. This series features a Windows CE based control which allows 6 axis simultaneous contouring.

Accutex also introduced their new DS series of CNC Sinkers which feature Windows CE controls, 6 axis simultaneous contouring, Z axis backslide, and Schneeberger linear bearings. They also offer a huge fixed bed Sinker with travels of X3,115mm, Y850mm, and Z600mm along with twin heads.

Accutex now offers a comprehensive line of Top EDM Small Hole machines including the TSH series featuring a 21 position tool changer, 5 position guide changer, and 6 axis control.

**AgieCharmilles**

A number of new technologies were introduced at the AgieCharmilles booth.

Prominently displayed was their new Cut 1000 OilTech machine which, as the name implies, utilizes oil as the dielectric. This ultra precise Wire EDM was designed at the request of numerous AgieCharmilles customers whose work is primarily carbide or PCD. The oil eliminates the effects of corrosion due to long periods of work piece immersion in the dielectric as well as allows smaller spark gaps enabling the production of very small internal corner radii. A new technology assures cutting speeds equivalent to similar water dielectric machines. The machine can handle wire diameters from .0008” to .008” utilizing a Duo wire system that works with two wire spools, each with a different wire size, and can switch between wires of different diameters automatically.

AgieCharmilles 100 series wire machines also featured some interesting technologies including a wireless probe, the ability to archive anomalies and parameters, a starting hole search pattern that includes tilting the wire, and the Econowatt 2 energy saving control technology. This feature shuts down the pumps at the conclusion of burning but keeps the parts submerged and wet until they are removed from the tank. This series also features a digital generator that only consumes 3 KVA, a significant energy saving over previous models.

AgieCharmilles also introduced their new LASER 5Ax Laser Ablation Center. The new machine provides a fully digitalized manufacturing process that yields detailed and nuanced texturing, microstructuring, engraving, marking and labeling. The mapping system of the LASER 5Ax uses a pulsed laser to render the desired texturing. The LASER 5Ax provides two optical and five mechanical axes.
Looking ahead to the future of tool and mold making, AgieCharmilles announced a partnership with EOS and demonstrated a fascinating new process chain for creating injection and blow mold tooling with conformal cooling channels. Conformal-cooled molds are already in use and have enabled high-end manufacturers to reduce part-production cycle times 17 to 20 percent and, in some cases, as high as 45 percent. This Direct Metal Laser Sintering process creates a mold component by laser sintering layers of metal powder based upon cross-sections of the component extracted from a 3-D CAD model of the mold detail. A significant advantage of DMLS is that it produces a near-net shape mold detail in one operation that is ready for secondary finishing, such as high speed milling, grinding, EDM, and Wire EDM from tool steels compatible with the molding process.

Beaumont EDM was the only EDM exhibitor at the show that could boast that all of its machines are Made in USA. They were featuring their Micro-pulse Technology for their small hole machines that drastically improves hole surface finishes and virtually eliminates micro-cracking. This technology features a computer controlled power supply that is adaptable to a variety of materials. Beaumont machines include break-through detection technology and the ability to re-dress diffuser electrodes on the machine. Beaumont also featured their depth finding technology that allows their machines to put in blind holes and hold +/- .0005” depth tolerance.

Belmont, already well known for their Small Hole and CNC Sinker machines, now has a Wire EDM line! They proudly displayed their new 530 Wire EDM featuring glass scales, fine finishing circuit, advanced 5 axis control, and optional Hirschmann A-axis.

Belmont also displayed their new OP4030 “OTTO Pro” CNC Sinker EDM. This machine features the advanced OTTO Pro generator, designed exclusively for Belmont by the renowned Dr Mark Otto. The OP4030 is presented as feature rich, high performance machine offered at a competitive price.

Belmont has evolved into an application driven system integrator, providing customized features to 80% of the machines that they sell. They have four engineers dedicated to specialized applications. For example, their BT series tilt EDM Drill is actually assembled in the USA at their Michigan facility.

Current EDM

The Current EDM booth featured the debut of their new ST300P small hole machine. The ST300P is a total re-design of the very popular ST300 machine. The new model is designed to be a portable machine so that it can be readily moved from one area of the shop to another. The ST300P is Made in USA, and features a new Seimens control, a new power supply, and the ability to run off of 120V single phase power which enhances its portability. The machine will handle tube sizes from .001” to .080”.

Current also displayed their RT3020S 2 head 5-Axis machine designed for aerospace cooling hole work. The drilling head features a 24 station toolchanger, and the sinking head (used for burning the diffuser shape) features a 4 station toolchanger. The Seimens control features the ability go directly to any specific hole#-row# position in a five axis program without having to dry run the program to get to that point. This feature is especially valuable to those shops doing selective hole repair work on existing airfoils. This machine also features a programmable servo.
As noted in our Cover Story, the big news from Chmer is the introduction of optional linear motor drives throughout their entire EDM line.

Chmer displayed both Wire and Sinker EDMs with linear motor axis drives.

Chmer also introduced its AW series of Wire EDMs designed for high end, high accuracy applications. The AW series is manufactured by a related company, AMS Technology. This series of machines feature FEA designed heavily ribbed castings, an optional granite table, sliding tank door, optional .1mm wire capability, and linear motors.

Chmer also displayed their 5 axis CNC high speed hole driller, widely used in aerospace applications.

The Hirschmann booth featured a number of new products. Hirschmann now offers a unique piece of tooling for holding PCD wafer blanks in EDM machines. They also displayed a 148mm pallet system with solid references. Also featured was a stainless steel A/B positioning axis that is fully sealed, submersible and does not require air purging. I also saw a high speed spin/index axis capable of supporting EDM turning operations at speeds of up to 1,000 rpm.

Makino showcased their new UPV series Ultra-high Precision Wire EDMs designed with an oil-based dielectric fluid system for high-accuracy machining of hardened materials and mirror-like surface finishing capabilities. The machines’ oil-based dielectric fluid systems create a smaller spark gap between the electrode and work piece than standard water-based fluid systems. This facilitates precision machining of narrower slot widths and smaller corner radii in a variety of materials, including hardened metals and polycrystalline diamond (PCD). Using oil-based dielectric fluid also eliminates the soft layer that can result from the EDM process and surface corrosion caused by electrolytic action. Makino’s UPV machines feature a fixed table design in which axis movements are controlled by machining heads. The SPG II power supply circuit improves finishing operations, yet enables cutting speeds comparable to water dielectric machines and is capable of producing surface finishes to 0.08 μm Rz. Included in the UPV design are ceramic insulators placed between the worktable and machine casting to reduce stray electric capacitance and enable the SPG II machining circuit to stabilize micro electrical discharges.
Makino also introduced their latest Ram EDM, the new EDAF Series, featuring a new mechanical design for increased rigidity and reduced thermal distortion. The “AF” in the Series names stands for “Arc Free”. Makino’s new ArcFree Technology helps prevent destructive DC arcs. This technology can actually burn through an arced electrode-work piece surface that would normally require operator intervention in the form of cleaning andstoning to get the burn going again. The EDAF series offers several features including a new automated Power Saving Mode that reduces the machine’s power consumption by 70 percent while idle, a rise and fall drop tank design with favorable automation capabilities, and an optional fine-hole configuration for precision machining of holes from .004” to .012” diameter.

Finally, Makino had an eye-catching display of a pallet of EDM wire which illustrated how much wire (and money) a customer could save by utilizing Makino’s reduced wire consumption strategies.

Mitsubishi featured their high end NA series Wire EDM. This machine was shown with an “all-in-one” A axis that can spin, index, and contour with all functions directly driven by the CNC control.

One of their wire machines demonstrating a “turn-and-burn” operation utilizing a Jauch Schmider low profile spin axis capable of 3,000 rpm.

Mitsubishi also showed their BA24 Wire EDM specifically designed for larger part production. This machine features a 16.5” submerged Z-height, V350 II high speed power supply, auto-

On the Sinker side, Mitsubishi featured their EA8PV with the Fine Hole option. This machine features a 1,500 RPM C-axis, 6 position guide changer, automatic mid position electrode support, .05mm-3mm capacity, fire extinguishing system with flame detector, granite table, and nano-pulse circuit.

Methods also displayed their Exeron series of CNC Sinksers featuring the new Exopuls+ generator. The new generator’s low wear capability was a demonstration of a 40mm deep burn with no flushing that resulted in only 15 microns of wear on the end of the electrode.

Ona manufactures the world’s largest EDM. Although it wasn’t practical to bring that machine to IMTS, Ona had a large poster depicting the machine on their booth back wall.

Ona Sinker machines feature a high speed Z axis obtaining 1g acceleration with a ball screw!

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Got a great idea that you’d like to share with fellow EDM’ers? Here’s your chance to share your knowledge and earn some cash and notoriety at the same time!

— Here are the rules —

1. Email a description of your idea along with photo’s, drawings, sketches, and your photo to: askroger@sbcglobal.net
2. Use the words “Reader Tech” in the heading of your email.
3. Include your name, company name, address and company phone number.
4. If we select your idea for publication, we’ll send you $100.00 as well as publish your photo and give you the recognition you deserve.
Ona Wire EDMs also feature an advanced crash detection system based upon sensors imbedded in the upper and lower guide heads which provide greater sensitivity and protection than merely monitoring servo lag. In addition, Ona Wire EDM’s have the capacity to handle DIN355 (100lb) spools for extended unattended machine operations.

Not new, but still very significant in the new Green conscious industrial environment is Ona’s unique Aqua Prima filtration systems for its Wire EDMs. The potential savings in filter, filter change labor, and filter disposal costs over the life of the machine can amount to tens of thousands of dollars.

Sodick introduced its new VZ Series of Wire EDMs. Promoted as an entry level priced machine with high end features such as linear motors with both velocity and position feedback, the ability to directly import DXF files, ceramic arms and table supports, small foot print ideal for cell applications, 4 axis turn & burn capabilities, and 1.2 g acceleration.

Also on display was Sodick’s AG Series of Wire EDMs. These machines, which are oriented toward medical and other production applications, feature automation compatible drop tanks, an energy saving power supply which recycles the energy of unused discharges, Environment Adaptation System with which machine temperature is stabilized by circulating the air inside the column, and a new high speed, automatic, annealing wire threader which can thread in the submerged mode.

Sodick, the originator of the oil dielectric Wire EDM, also displayed their high end, ultra precision AP250 oil dielectric machine. The AP Series is used to EDM small intricate precision parts requiring fine wire diameter and high cutting accuracy. In addition to the oil dielectric which ensures the minimum overburn, this machine features ultra stable bridge construction and a ceramic “C” type lower arm which eliminates seal plate forces.

Finally, Sodick displayed their AG Series Sinkers, which like their AG Series Wire EDM’s are designed with automation in mind. These machines feature drop tank design, a control pendant that can be mounted on either side to clear robotics, cooled linear motors, and a C-Axis that can rotate at speeds up to 2,000 rpm.

The emphasis at the System 3R booth was automation. They have produced more than 1,600 robotic cells worldwide, including 500 robotic cells delivered to USA shops. Their robots can change both electrodes and work pieces weighing up to 200 kg. A typical automated cell might include a graphite mill, sinker, and CMM along with a storage carousel. System 3R’s motto is “Automation for increased productivity for EDM and beyond” since robotic cells work just as well with other machining processes in addition to EDM.

Roger Kern